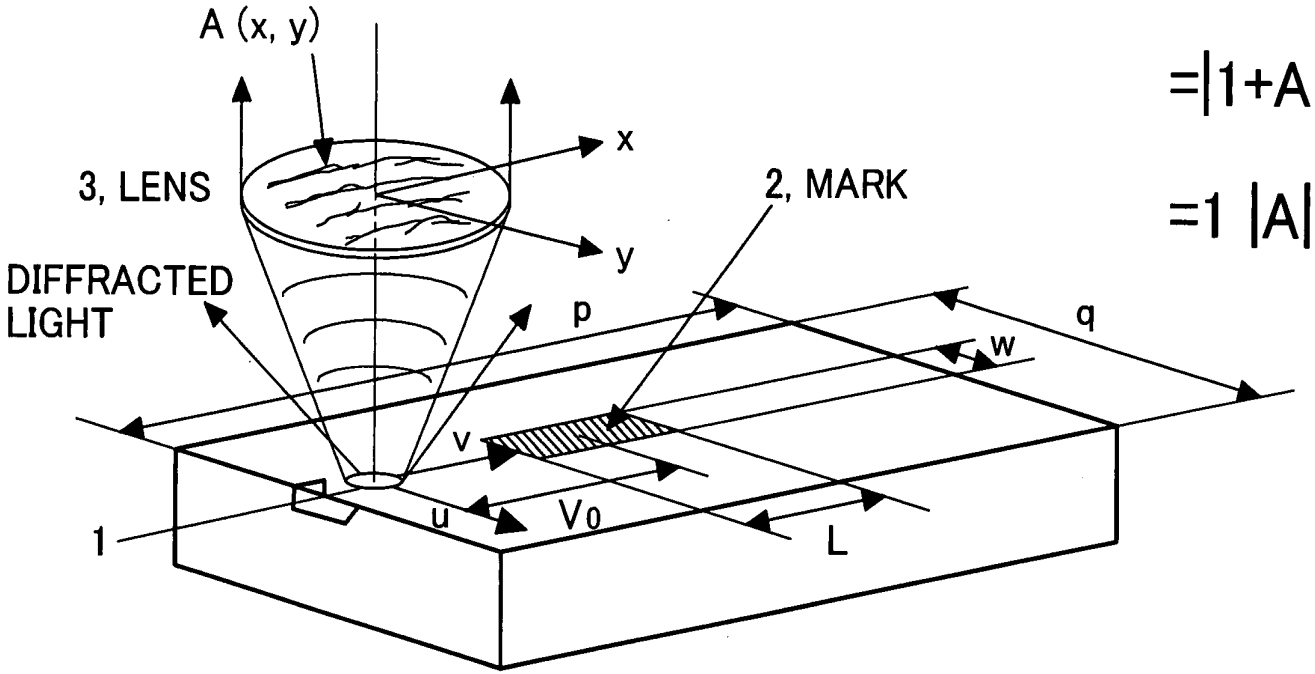
# FIG.1

EXPRESSION (1)

$$\text{SIGNAL} \propto I(x, y)$$

$$= |1+A|^2$$

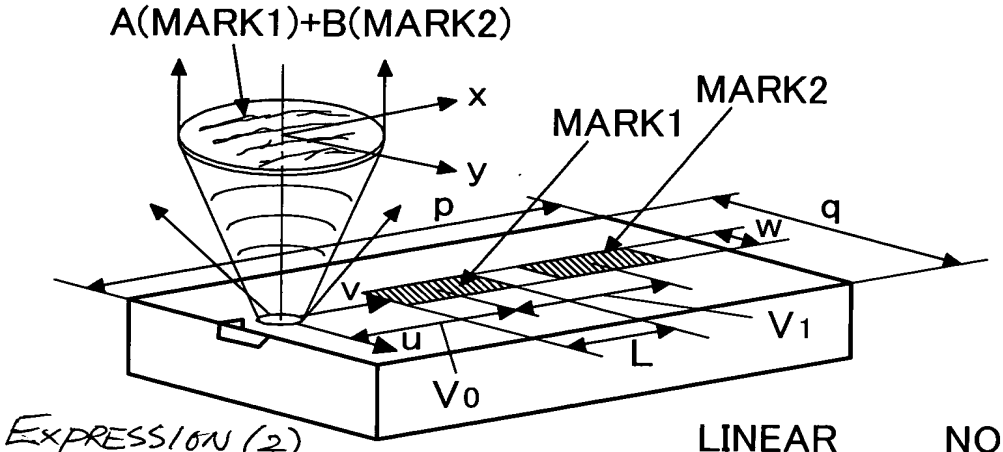
$$= 1\ |A|^2 + A + \overline{A}$$




I (x, y) : LIGHT INTENSITY ON LENS

A (x, y) : COMPLEX AMPLITUDE COMPONENT OF THE DIFFRACTED LIGHT FROM MARK THROUGH THE LENS

FIG.2




EXPRESSION (2)

LINEAR COMPONENT

NON-LINEAR COMPONENT

$$S \propto I(x, y) = |1+A+B|^2 = 1+\boxed{|A|^2+A+\bar{A}+|B|^2+B+\bar{B}}\ \boxed{+A\bar{B}+B\bar{A}}$$

FIG.3

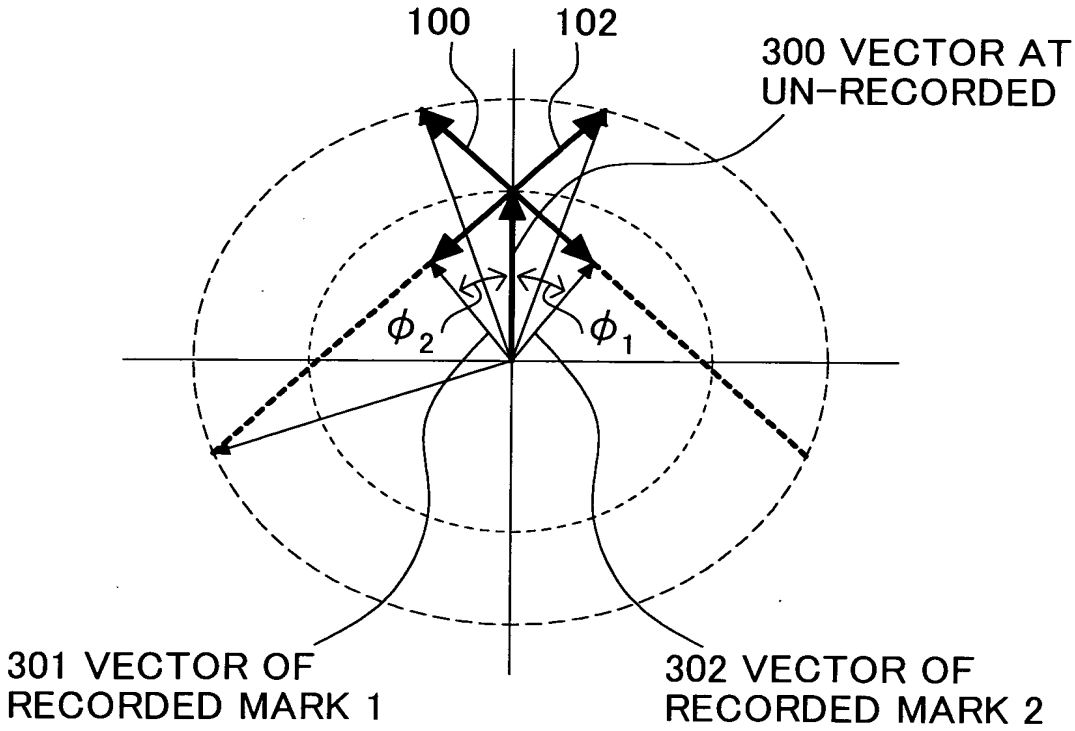


FIG.4

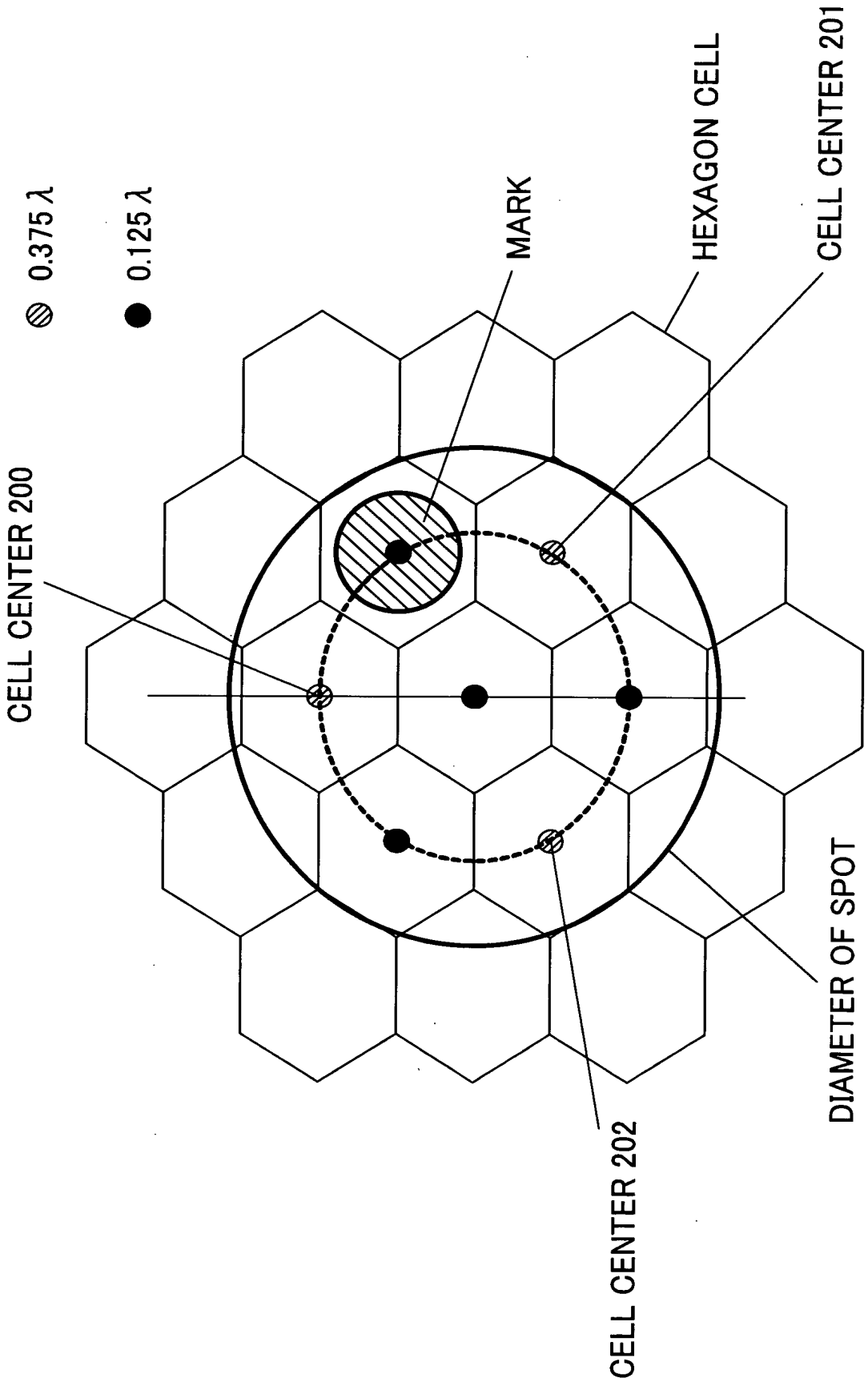

0.375 λ
0.125 λ
MARK
HEXAGON CELL
CELL CENTER 201
CELL CENTER 200
CELL CENTER 202
DIAMETER OF SPOT

FIG.5

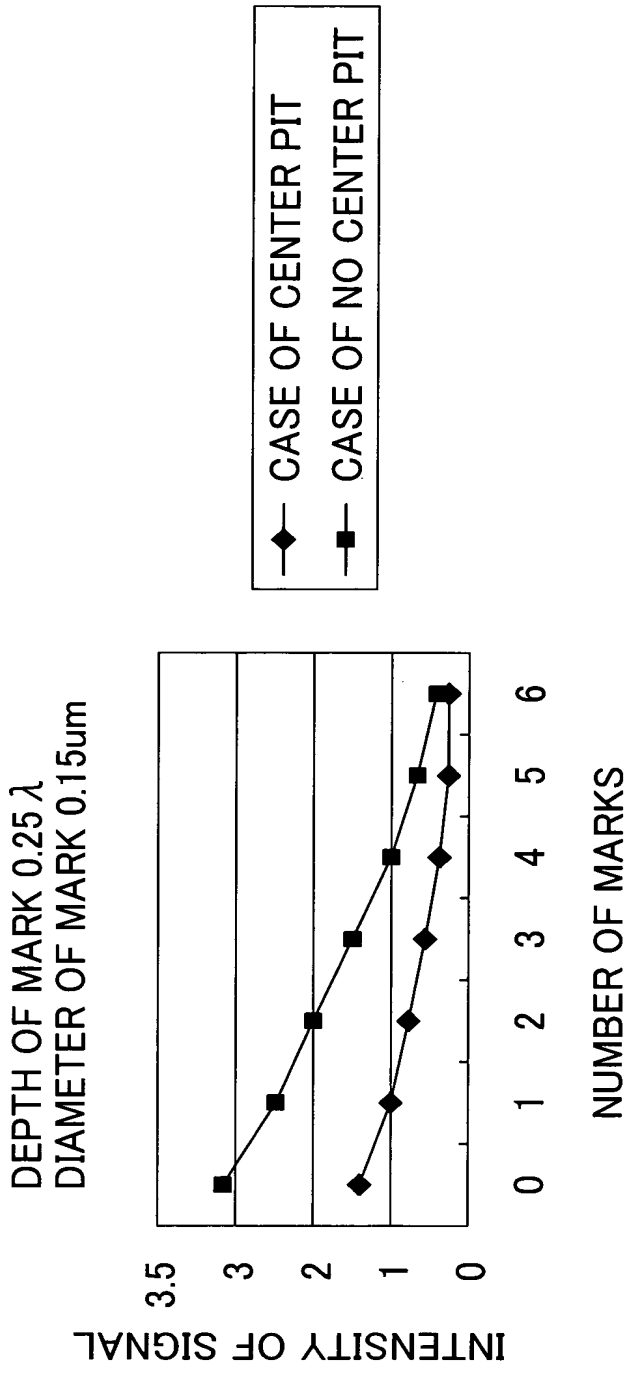

DEPTH OF MARK 0.25 λ
DIAMETER OF MARK 0.15um
CASE OF CENTER PIT
CASE OF NO CENTER PIT
INTENSITY OF SIGNAL
3.5
3
2
1
0
0 1 2 3 4 5 6
NUMBER OF MARKS

FIG.6

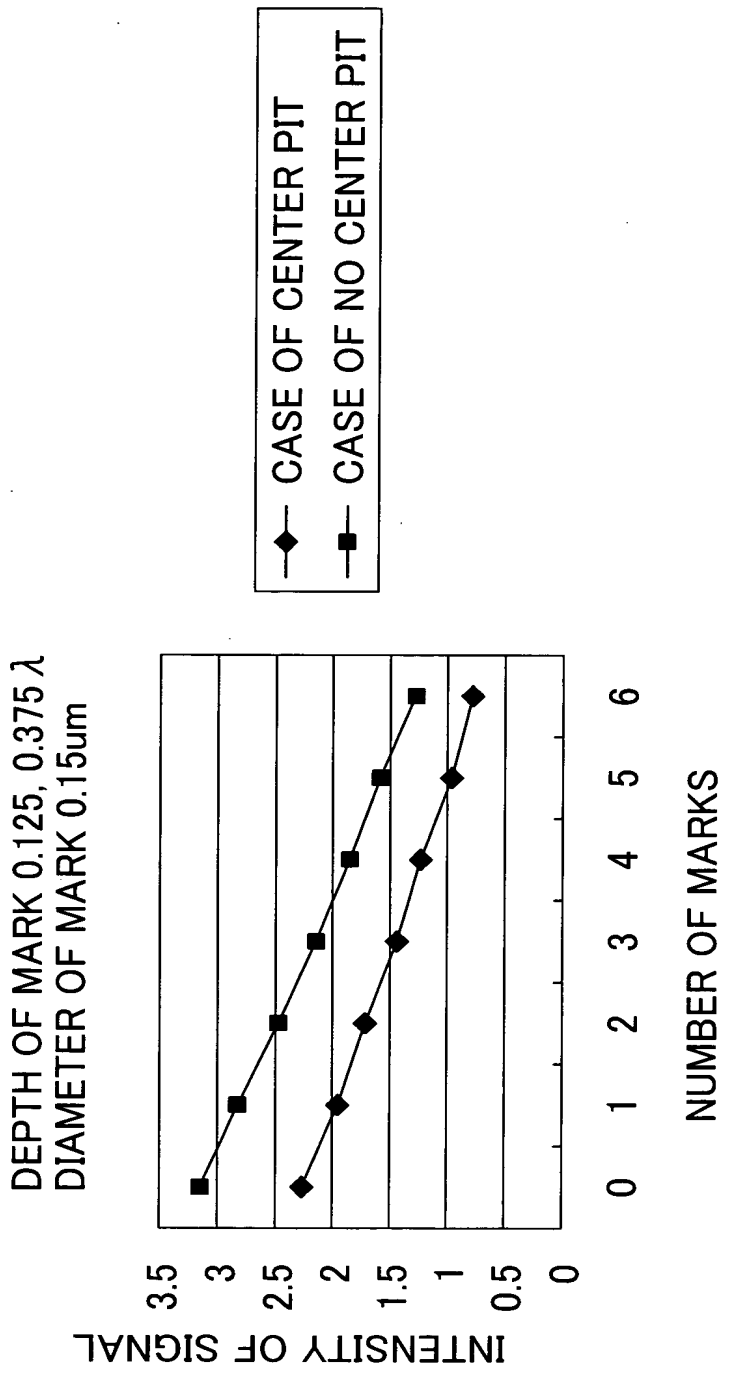

DEPTH OF MARK 0.125, 0.375 λ
DIAMETER OF MARK 0.15um
CASE OF CENTER PIT
CASE OF NO CENTER PIT
INTENSITY OF SIGNAL
3.5
3
2.5
2
1.5
1
0.5
0
0 1 2 3 4 5 6
NUMBER OF MARKS

FIG.7

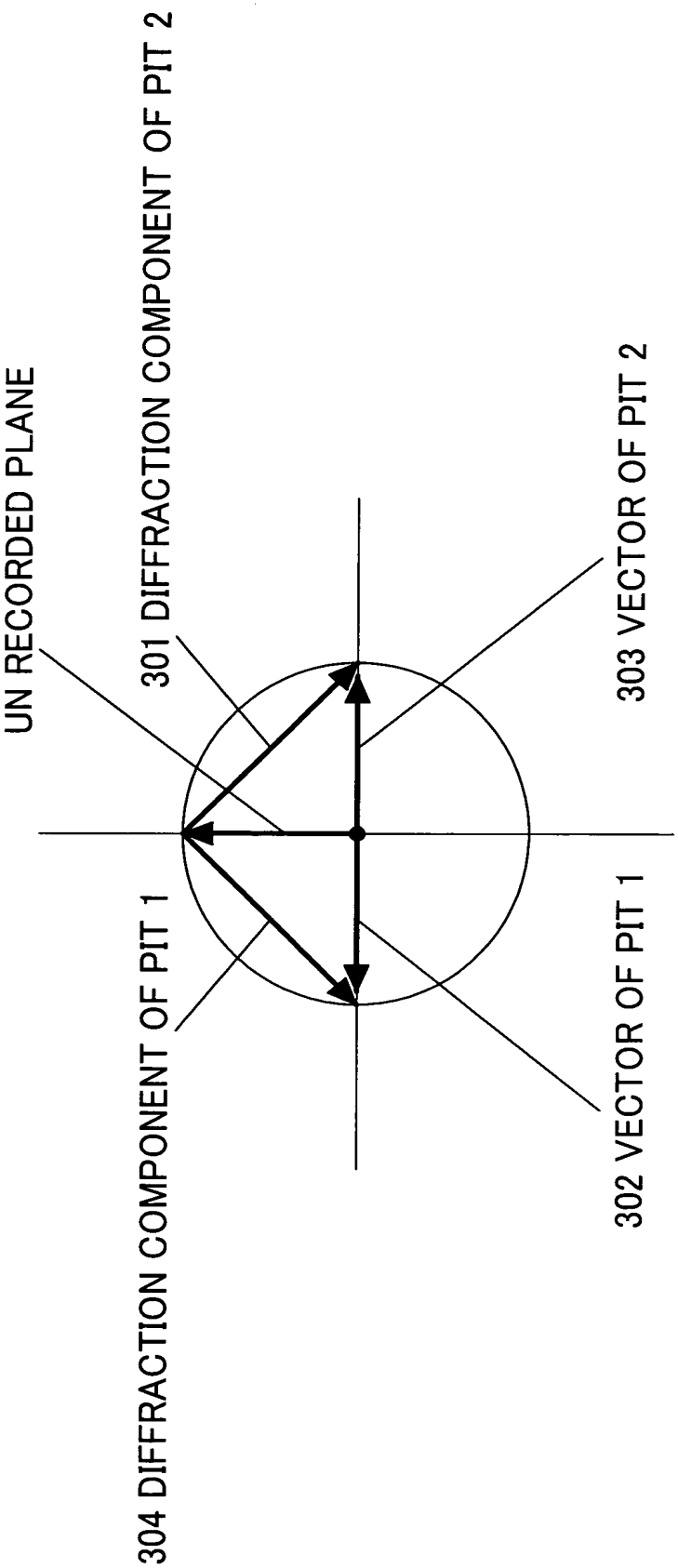

UN RECORDED PLANE
301 DIFFRACTION COMPONENT OF PIT 2
303 VECTOR OF PIT 2
304 DIFFRACTION COMPONENT OF PIT 1
302 VECTOR OF PIT 1

FIG.8

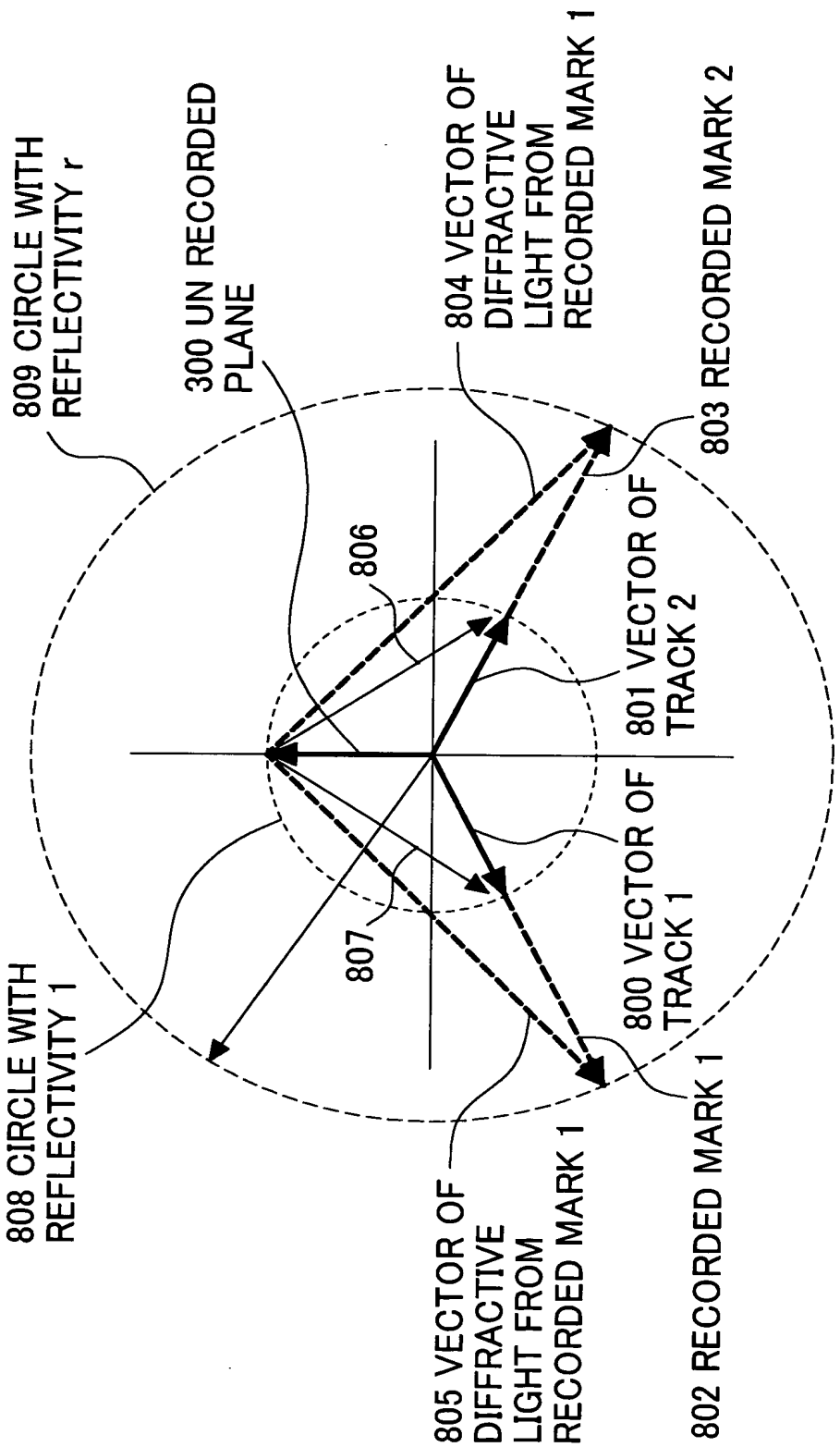

809 CIRCLE WITH REFLECTIVITY r
300 UN RECORDED PLANE
804 VECTOR OF DIFFRACTIVE LIGHT FROM RECORDED MARK 1
803 RECORDED MARK 2
806
801 VECTOR OF TRACK 2
800 VECTOR OF TRACK 1
807
808 CIRCLE WITH REFLECTIVITY 1
805 VECTOR OF DIFFRACTIVE LIGHT FROM RECORDED MARK 1
802 RECORDED MARK 1

FIG.9

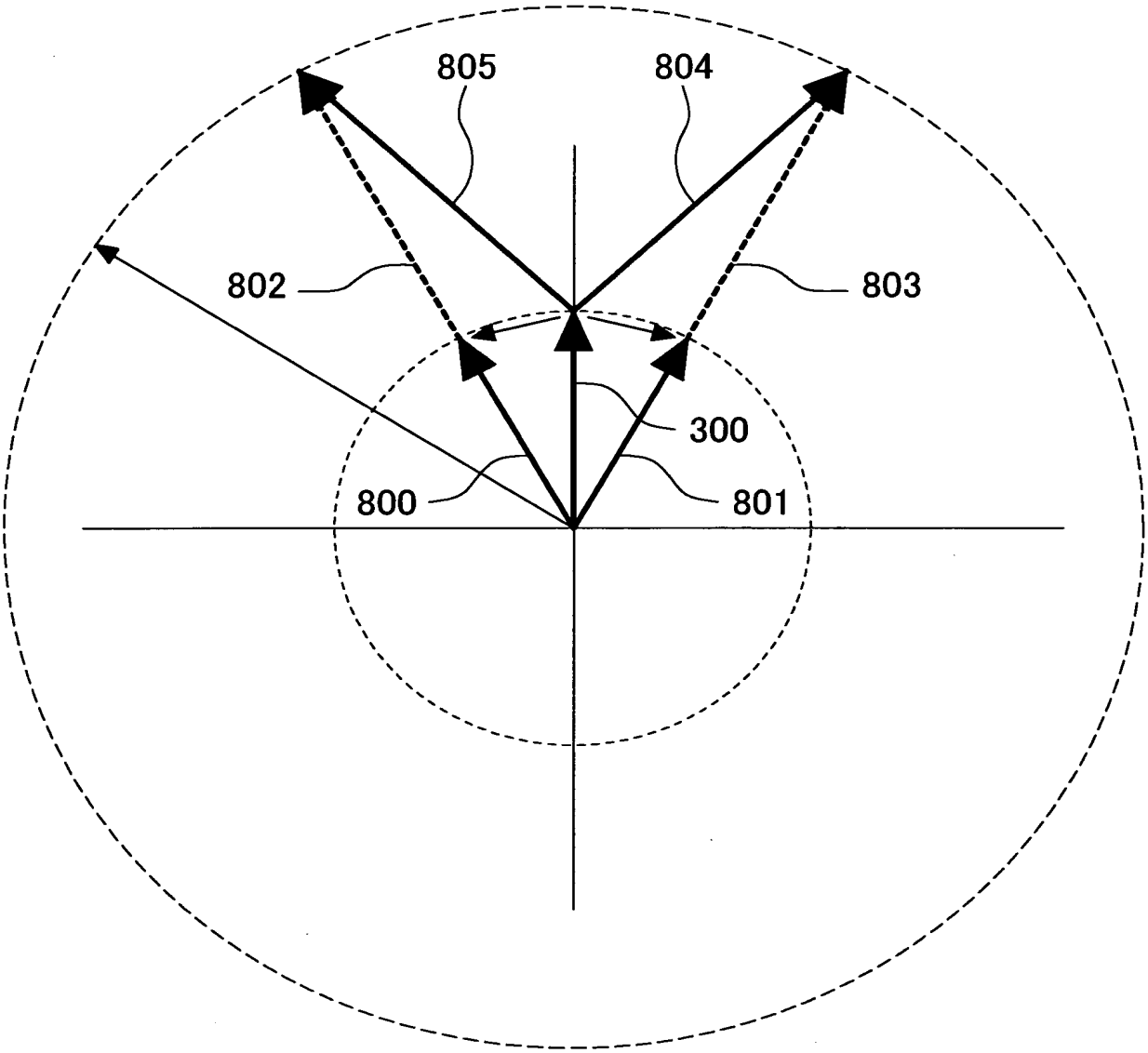


FIG.10

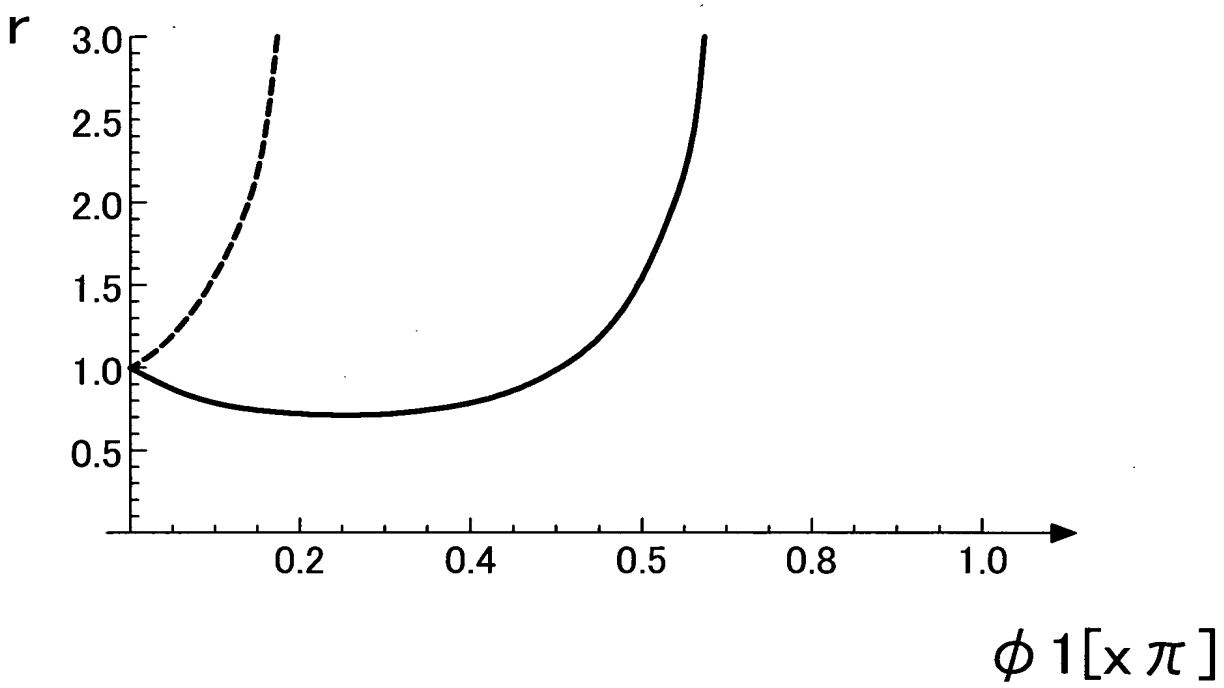


FIG.11A

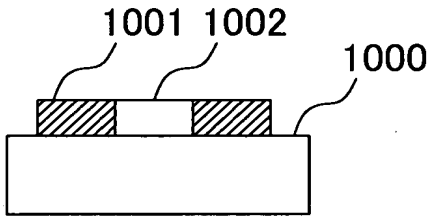



FIG.11B

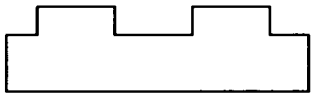


FIG.11C

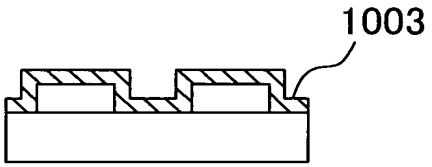



FIG.11D

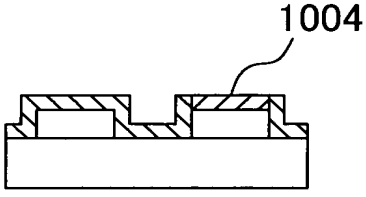



FIG.11E

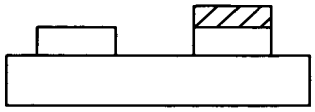


FIG.11F

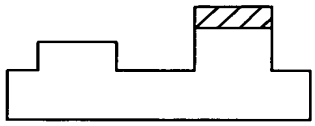


FIG.11G

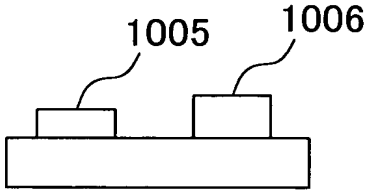


FIG.12

| TRACK | BITS | PATTERN |
|---|---|---|
| n | 0 | |
| | 1 | |
| n+1 | 0 | |
| | 1 | |

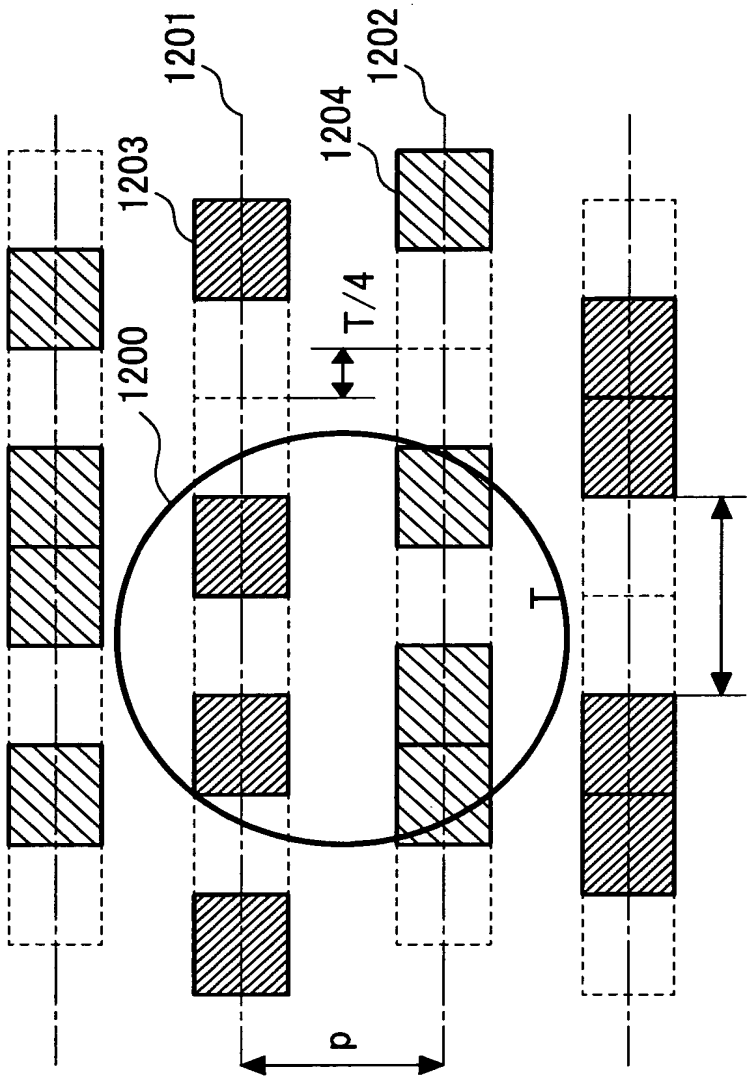


FIG.13

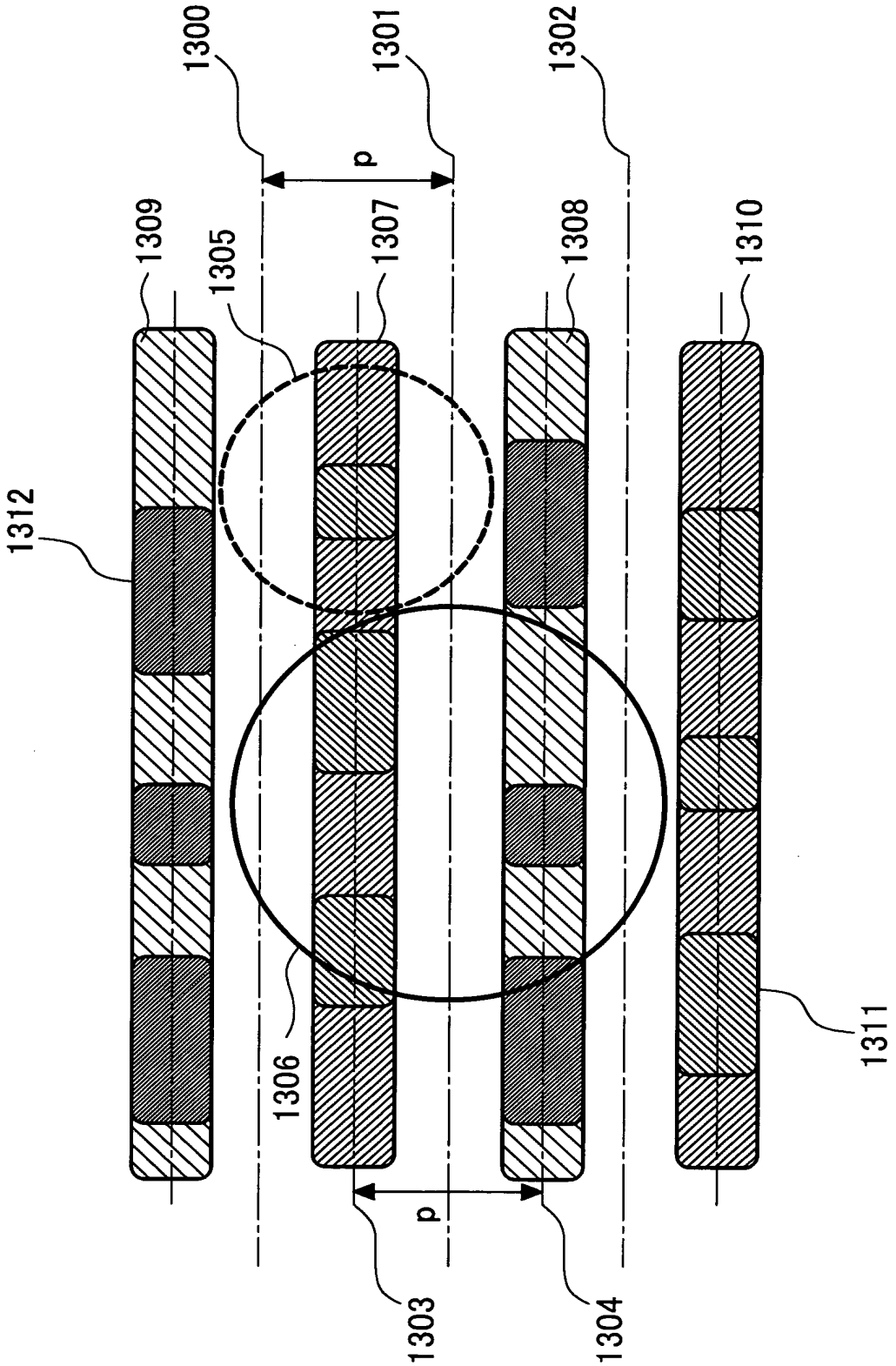

1300
1301
1302
p
1309
1305
1307
1308
1310
1312
1306
1311
p
1303
1304

FIG.14

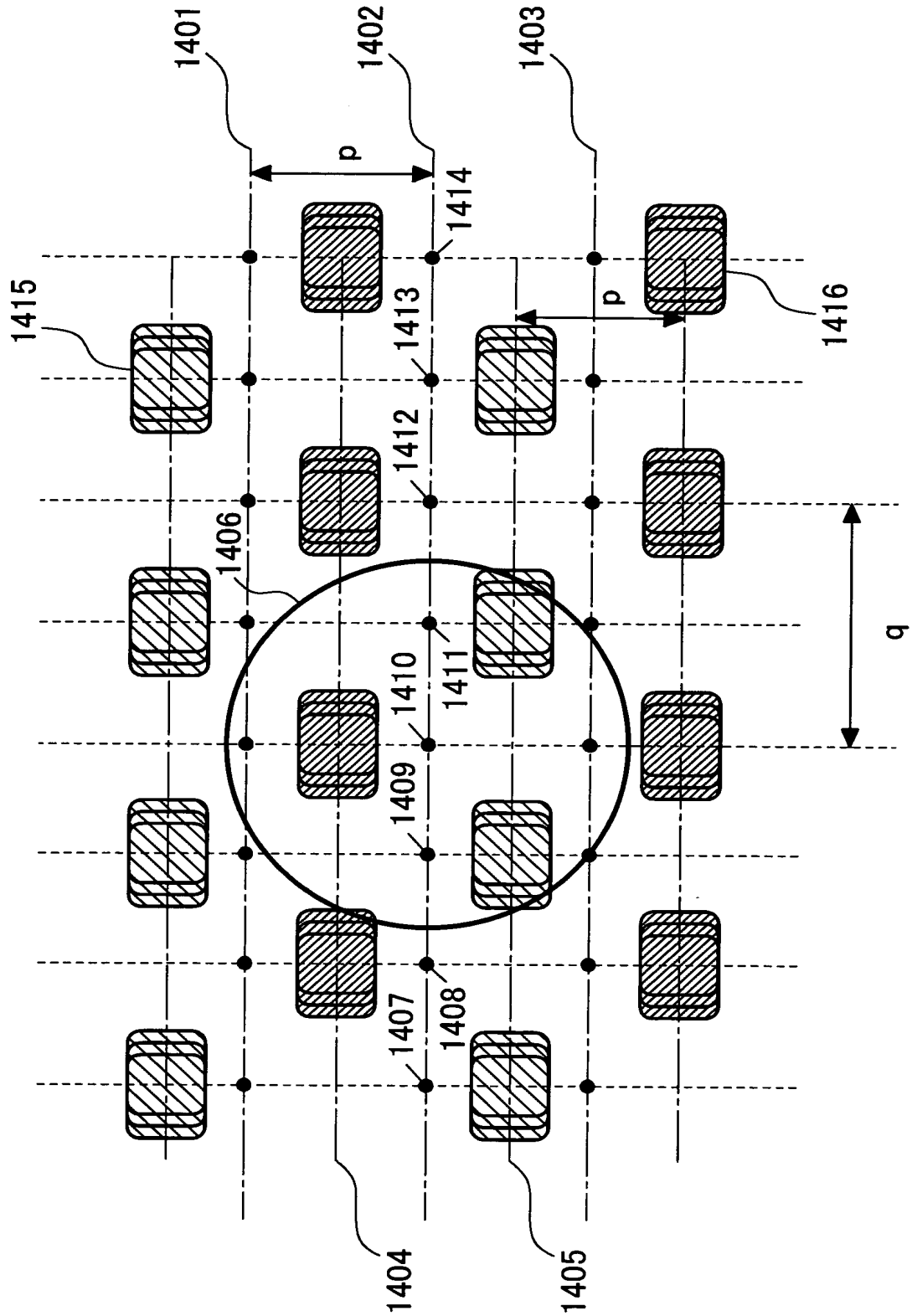

1401
1402
1403
p
1414
1415
1413
p
1416
1412
1406
1411
1410
q
1409
1407
1408
1404
1405

FIG.15

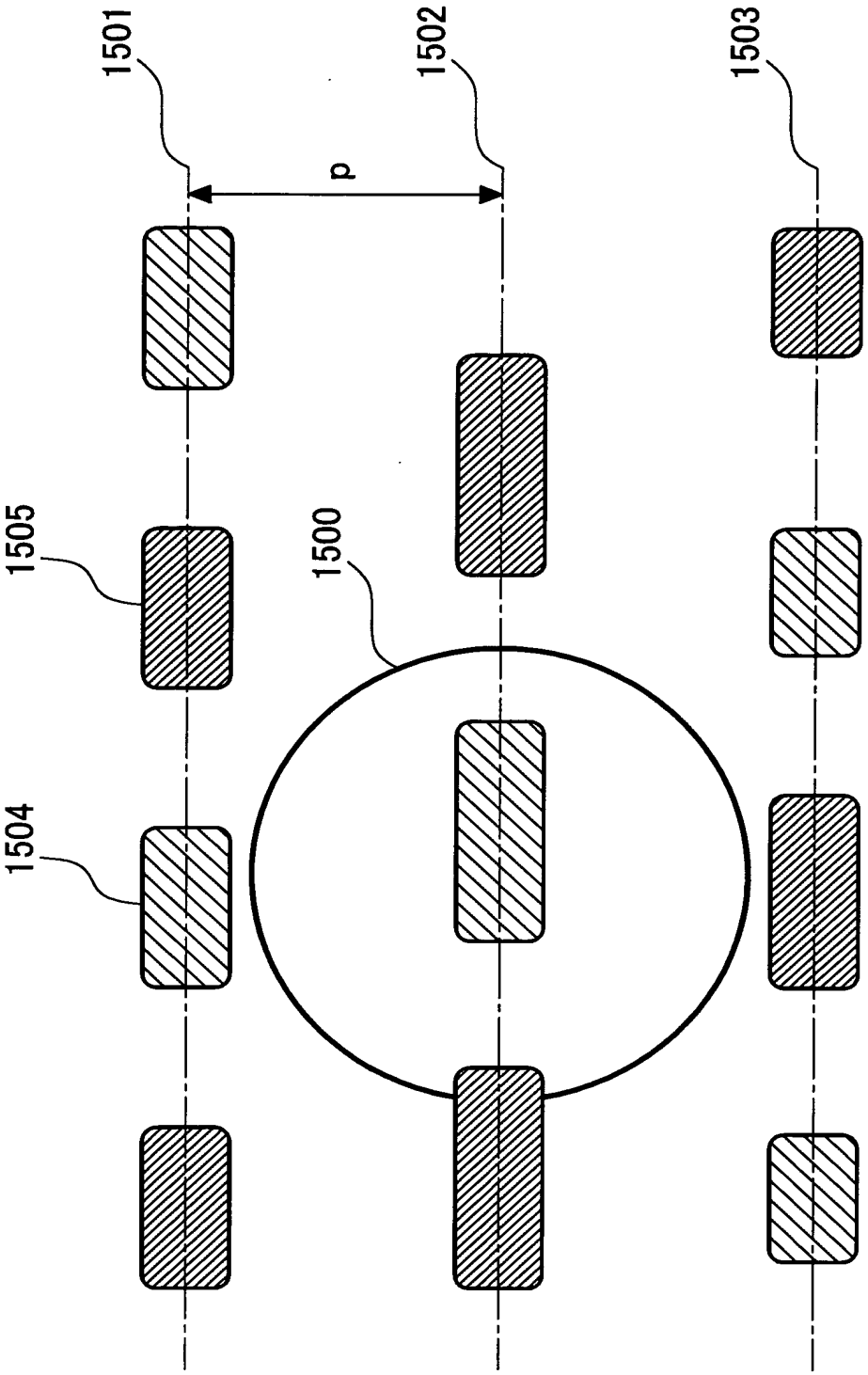


FIG.16

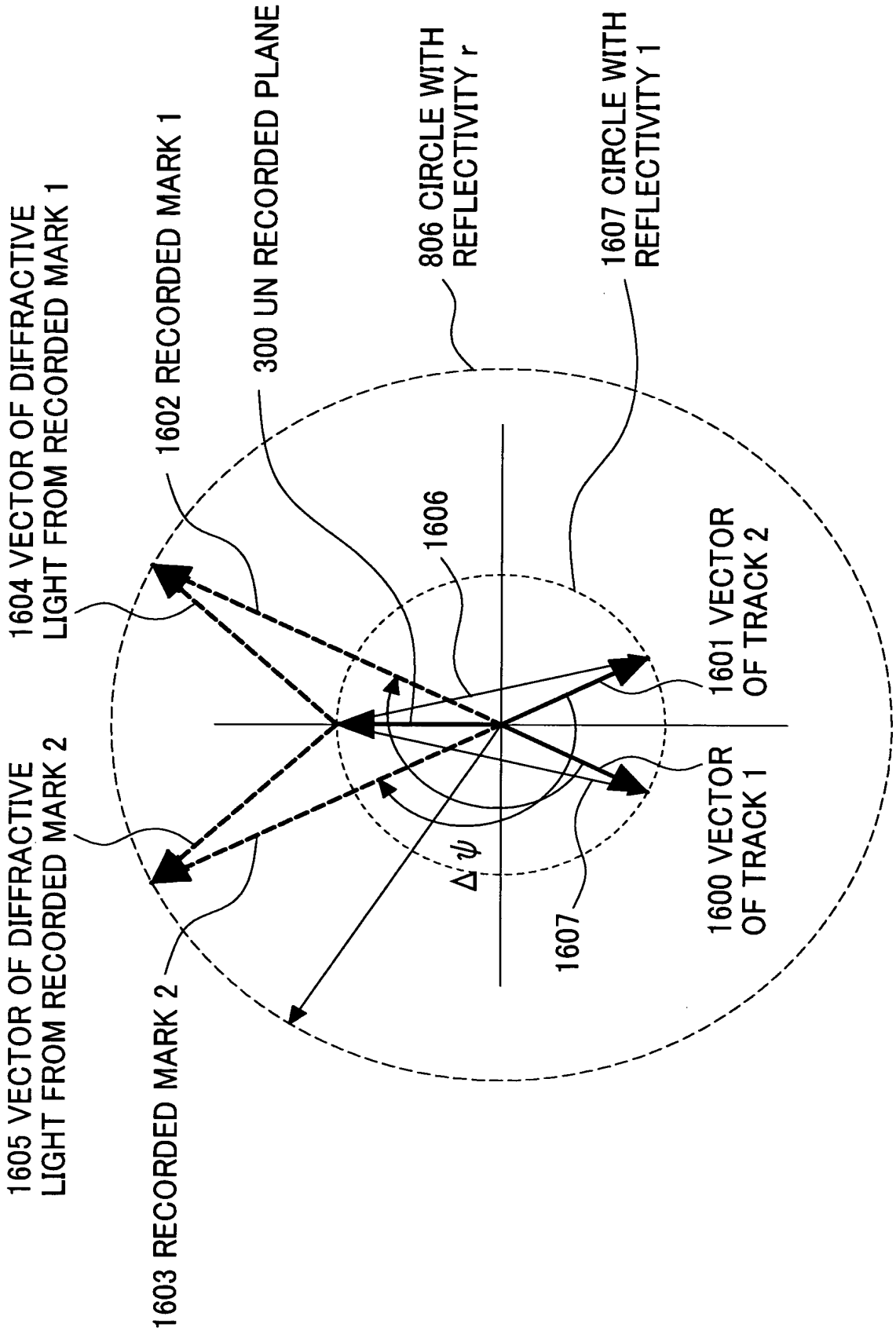

1604 VECTOR OF DIFFRACTIVE LIGHT FROM RECORDED MARK 1
1602 RECORDED MARK 1
300 UN RECORDED PLANE
806 CIRCLE WITH REFLECTIVITY r
1607 CIRCLE WITH REFLECTIVITY 1
1606
1601 VECTOR OF TRACK 2
1605 VECTOR OF DIFFRACTIVE LIGHT FROM RECORDED MARK 2
Δψ
1607
1600 VECTOR OF TRACK 1
1603 RECORDED MARK 2

FIG.17

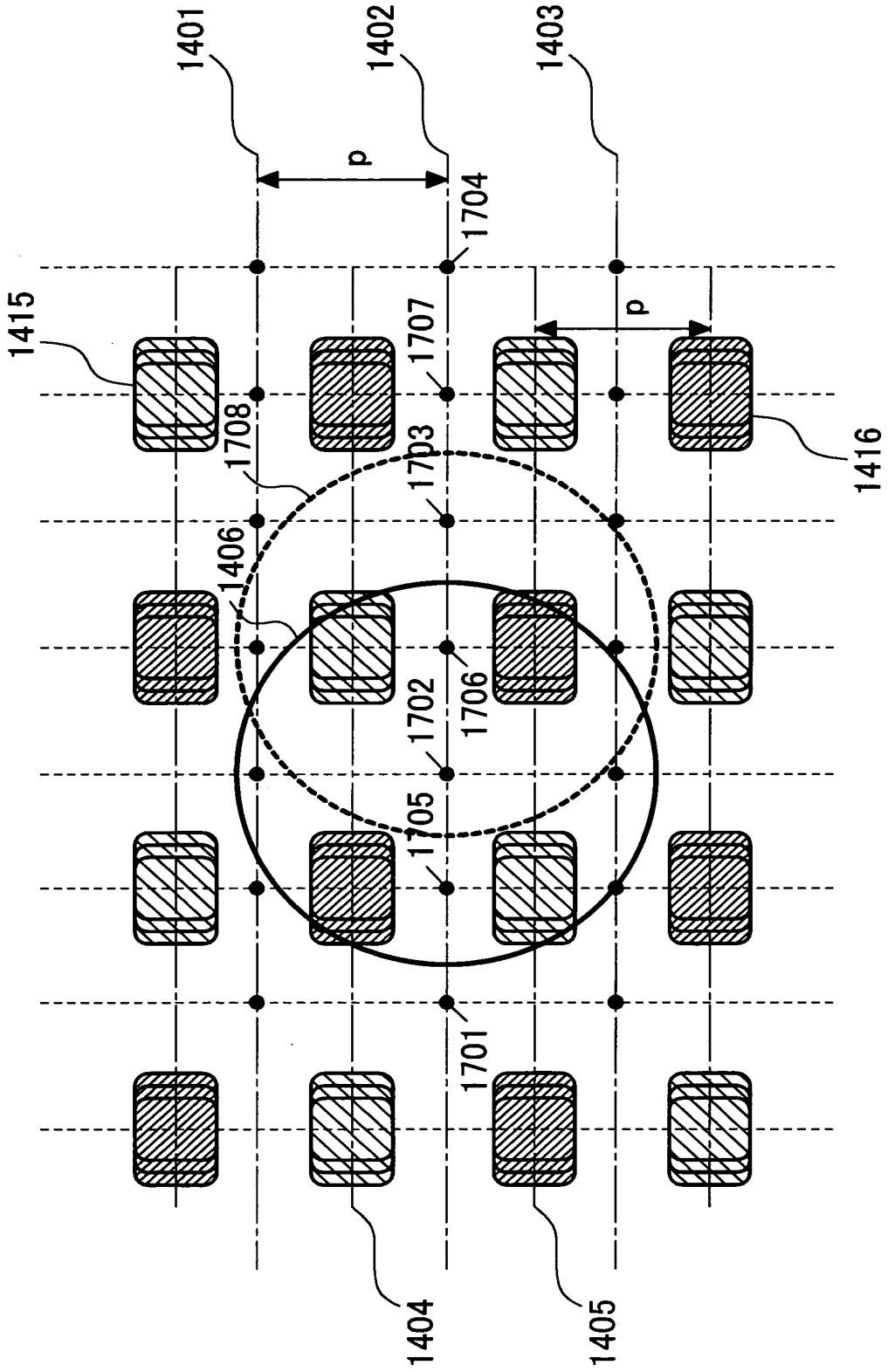

1401
1402
1403
p
1704
1415
1707
p
1708
1703
1416
1406
1702
1706
1705
1701
1404
1405

FIG.18A

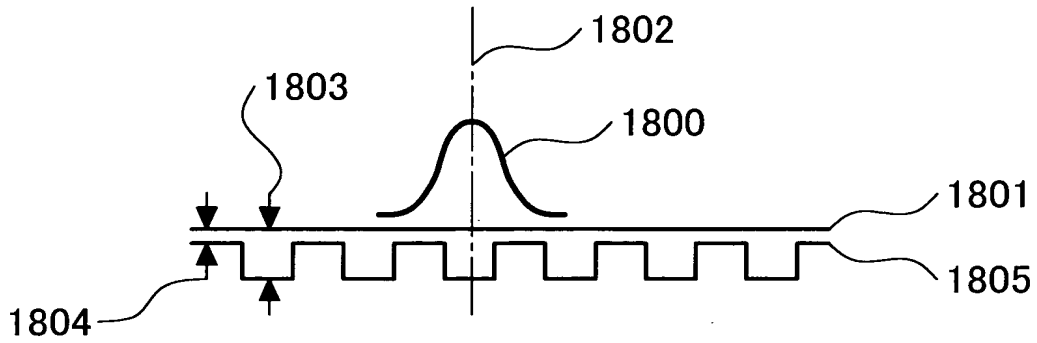
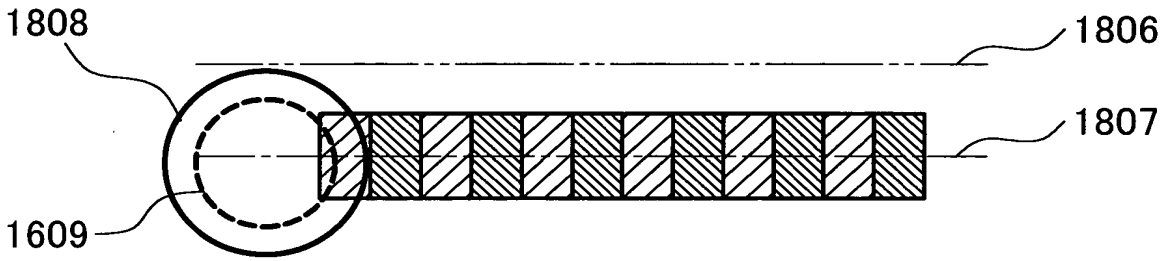



FIG.18B



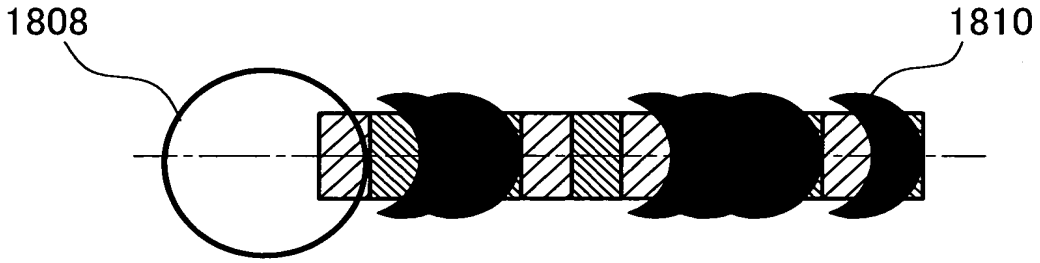


FIG.18C